

REMARKS

By this amendment, applicants have amended the claims to more clearly define their invention. In particular, applicants have amended claim 1 to indicate that the nitrogen-containing compound can be a derivative of the compounds in the Markush group. Claim 4 has been amended to depend from claim 1 and to eliminate the indefiniteness problems alleged by the Examiner. In view of these amendments, it is submitted all of the claims now in the application comply with the requirements of 35 USC 112, second paragraph. Therefore, reconsideration and withdrawal of the rejection of claims 1 - 4, 7, 9 - 11, 14, 16 and 27 under 35 USC 112, second paragraph, are requested. It is submitted the term "derivatives" and "substituted" are well known in the art and are not indefinite as alleged by the Examiner.

The rejection of claims 1 - 4, 7, 9 - 11, 14, 16 and 27 under 35 USC 103 in the outstanding office action is traversed, at least for the reasons provided in the amendment filed January 21, 2000 and the second amendment filed February 11, 2000, which reasons are incorporated herein by reference.

The present invention is directed to a gas-producing composition for gas generators. The composition provides non-toxic, azide-free mixtures for the production of gas by combustion. These gas-producing mixtures can be used, inter alia, in safety devices, for example, in air bag systems for inflation of air bags in motor vehicles and air craft. However, they are also suitable for lifting heavy loads by inflation of bags placed under them, or for expulsion of, e.g., fire extinguishing powder, or for other measures where the performance of work requires rapid formation of gases.

The mixtures in accordance with the present invention are non-toxic and, in contrast to azide-containing mixtures, are easy to handle. The nitrogen-containing compounds to be used

according to the invention, are those which, in the mixture with the oxidants, according to the invention, mainly form, in their thermal/chemical reaction, the compound CO_2 , N_2 , O_2 and H_2O , but do not evolve any gases such as CO or NO_x in concentrations that can endanger health. See, e.g., page 4, lines 17 to page 5, line 16 of applicants' specification.

Thus, the gas-producing composition of the present invention, includes as nitrogen-containing compounds, at least one compound selected from the group consisting of tetrazole, triazole, triazine, cyanic acid, urea, their derivatives and their salts. An oxidant, the composition uses at least three compounds selected from the group consisting of peroxides, nitrates, chlorates and perchlorates. The composition also includes combustion moderators which are capable of influencing the combustion and its rate by heterogenous or homogenous catalysis. Such is neither disclosed nor suggested by the applied prior art.

The patent to Blau et al discloses a method for preparing anhydrous tetrazole gas generate compositions. According to Blau et al, the composition includes at least one fuel selected from the group consisting of tetrazoles and an oxidizer selected from the group consisting of a metal peroxide, an organic nitrate, an inorganic nitrate, a metal oxide, a metal hydroxide, an inorganic chlorate, an inorganic perchlorate, or a mixture thereof. The Blau et al patent does not disclose the specific combination of nitrogen-containing compounds, the oxidant comprising at least three of the indicated compounds, and the combustion moderators presently claimed.

The patent to Lund et al '059 discloses a solid composition for generating a nitrogen-containing gas, including an oxidizer and a 5-aminotetrazole fuel. The oxidizer is disclosed to be generally a metal oxide or a metal hydroxide. The composition can include certain other components, such as secondary oxidizers, burn rate modifiers, slag formers and binders. While this patent discloses that the oxidizer may be a mixture of certain referenced oxidizing

agents or the referenced oxidizing agents and other oxidizing agents, this patent does not suggest the specific combination of the nitrogen-containing compounds presently claimed, the oxidant comprising at least three of the indicated compounds presently claimed and the combustion moderators.

The Examiner has cited the patent to Wardel et al as discloses zinc peroxide as an oxidizer. However, clearly nothing in Wardel et al suggests the composition presently claimed, including the combination of the nitrogen-containing compounds claimed, an oxidant comprising at least three compounds selected from a particular group, and the combustion moderators.

The Examiner alleges the Highsmith et al patent to generally suggest mixtures and a plurality of oxidizers. However, Highsmith does not suggest the presently claimed composition.

European Patent Publication No. 0 607 446 to Yoshida discloses a gas generating agent for air bags which consists of a nitrogen-containing organic compound and an oxohalogenate. While the Examiner refers to Example 15 in Table 1 of this publication as showing three oxidizers, Table 1 appears to show one halogen oxo acid salt (KClO_4) and two combustion control catalysts (CuO and CaO_2). It is not clear where the Examiner finds three oxidizers to be disclosed.

It is submitted the Examiner has done nothing more than use hindsight reconstruction to pick and chose among isolated disclosures in the prior art to arrive at the presently claimed invention. Such is not a proper determination of the obviousness issue. Accordingly, it is submitted the presently claimed invention is patentable over the proposed combination of references.

In view of the foregoing amendments and remarks, favorable reconsideration and

allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus Deposit Account No. 01-2135 (Case: 306.35565X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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1. (Twice Amended) Gas-producing composition for gas generators, comprising nitrogen-containing compounds, wherein said gas-producing composition comprises,
 - a) as nitrogen-containing compounds, at least one compound selected from the group consisting of tetrazole, triazole, triazine, cyanic acid, urea, their derivatives and their salts;
 - b) as oxidant, at least three compounds selected from the group consisting of peroxides, nitrates, chlorates and perchlorates; and
 - c) combustion moderators which are capable of influencing the combustion and its rate by heterogeneous or homogeneous catalysis.

4. (Twice Amended) Gas-producing composition according to claim 2 1, wherein the nitrogen-containing compounds are ~~selected from the group of the~~ tetrazole derivatives ~~and are~~ selected from the group consisting of compounds, 5-aminotetrazole; lithium, sodium, potassium, zinc, magnesium, strontium or calcium 5-aminotetrazolate; 5-aminotetrazole nitrate, sulphate, or perchlorate; 1-(4-aminophenyl)-tetrazole, 1-(4-nitrophenyl)-tetrazole, 1-methyl-5-dimethyl-aminotetrazole, 1-methyl-5-methylamino-tetrazole, 1-methyltetrazole, 1-phenyl-5-aminotetrazole, 1-phenyl-5-hydroxytetrazole, 1-phenyltetrazole, 2-ethyl-5-aminotetrazole, 2-methyl-5-aminotetrazole, 2-methyl-5-carboxyltetrazole, 2-methyl-5-methylaminotetrazole, 2-methyltetrazole, 2-phenyltetrazole, 5-(p-tolyl)tetrazole, 5-diallylaminotetrazole, 5-dimethylaminotetrazole, 5-ethylaminotetrazole, 5-hydroxytetrazole, 5-methyltetrazole, 5-methylaminotetrazole, 5-n-decylaminotetrazole, 5-n-heptylaminotetrazole, 5-n-octylaminotetrazole, 5-phenyltetrazole, 5-phenylaminotetrazole, bis-(aminoguanidine)-azotetrazole and diguanidinium-5,5'-azo-tetrazolate, 5,5'-bitetrazole and 5,5'-bi-1H-tetrazoleammonium compounds.